

Date: Friday, 11/17/2006 9:07:29 AM  
 User: Kim Johnston

## Process Sheet

<b>Customer</b> : CU-DAR001 Dart Helicopters Services	<b>Drawing Name</b> : 212/205 HIGH AFT X-TUBE ASSEMBLY
<b>Job Number</b> : 29508	
<b>Estimate Number</b> : 10257	
<b>P.O. Number</b> :	<b>Part Number</b> : D212664201
<b>This Issue</b> : 11/17/2006 <b>S.O. No.</b> :	<b>Drawing Number</b> : D212-664-241 REV B
<b>Prsht Rev.</b> : NC	<b>Project Number</b> : N/A
<b>First Issue</b> : / / <b>Type</b> : LANDING GEAR	<b>Drawing Revision</b> : B
<b>Previous Run</b> : 29507	<b>Material</b> :
<b>Written By</b> :	<b>Due Date</b> : 12/20/2006 <b>Qty:</b> 1 <b>Um:</b> Each
<b>Checked &amp; Approved By</b> :	
<b>Comment</b> : Est Rev: E 04.02.16 Reformat K/DS	
Est Rev: F 06-03-29 Remove Coments on Pick List JLM	

## Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description :

1.0

DC

DOCUMENT CONTROL

**Comment:** DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D212-664-201CHG002

2.0

D6006129

Crosstube material

**Comment:** Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6006-129 Crosstube 25666

Check OD = 3.250"; ID = 2.220"

3.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE

**Comment:** MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand &amp; install plugs DT8534 on both ends as per Folio FA114

2-Turn first side as per Folio FA114

3-Deburr &amp; Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241.

4.0

QC1

INSPECT ALL DIM TO DIM SHEET

**Comment:** INSPECT ALL DIM TO DIM SHEET

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

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Job Number: 29508

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA114

2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241. *BC 06.11.19 1*

6.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

*BC 06.11.19 1*

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

*SA 06.11.19 1*

8.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Polish entire outside surface of crosstube

2-Remove sand and plugs

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-241

*BC 06.11.19 1*

9.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of machining

*m-h 06/12/06 ①*

10.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

*DD 06/12/06 ①*

11.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

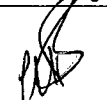
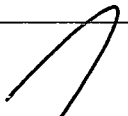
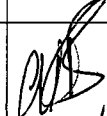
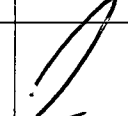
Bend tube as per Dwg D212-664-241 using CNC bender program 212-af and Folio FT007

*E.L. 2-1-2* *PTC*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
07-1-2	11	Employee Accidentally hit & used controls, and crushed Tube. DP 07-1-2	 07/01/17	Re-Train employee, Scrap & destroy Tube. DP	P.L. 07-1-2	 07-01-03 07-01-17	 07/01/17	 07-01-03

NOTE: Date & initial all entries

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Job Number: 29508

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

13.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D212-664-241 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D212-664-241 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241

14.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of bending and drilling

15.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

16.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

17.0

OUTSIDE SERVICE

OUTSIDE SERVICES



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038

Issue P/O: \_\_\_\_\_

LPI as per ASTM 1417 Level 2

Attach copy of NDT results to work order

18.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order.

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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Job Number: 29508

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

19.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: DIMENSIONAL CHECK

Inspect for damage & ensure results are as per Dwg D212-664-241

20.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

21.0

QC14

Inspect Spray Paint



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

22.0

D2856600

Abrasion Strip



Comment: Qty.: 0.8400 f(s)/Unit Total : 0.8400 f(s)

Pick:

Qty Part number Description Batch

2 D2856-600-1009 Abrasion Strip \_\_\_\_\_

23.0

D29401

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2940-1 Support \_\_\_\_\_

24.0

MS2192028

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28 Clamp \_\_\_\_\_

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



Date: Friday, 11/17/2006 9:07:30 AM  
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## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH AFT X-TUBE ASSEMBLY

Job Number: 29508

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

25.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install abrasion strips as per QSI 035 using DT8582

2-Install supports and clamps as per Dwg D212-664-241. Torque clamps to 80-100 in lb.

26.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

27.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

28.0

D34281

Placard



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Placard

Batch: \_\_\_\_\_

29.0

AN640A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: \_\_\_\_\_

30.0

AN641A

Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Bolt

Batch: \_\_\_\_\_

31.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)

Washer

Batch: \_\_\_\_\_

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Job Number: 29508

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)

Nut

Batch: \_\_\_\_\_

33.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

34.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Identify and pack for shipping as per PPP D212-664-201

35.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



W 07-0312

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	29508
<b>Description:</b> Crosstube Assembly (205/212 High Aft)	<b>Part Number:</b>	D212-664-241
<b>Inspection Dwg:</b> D212-664-241 <b>Rev:</b> B		Page 1 of 1

### FIRST ARTICLE INSPECTION CHECKLIST

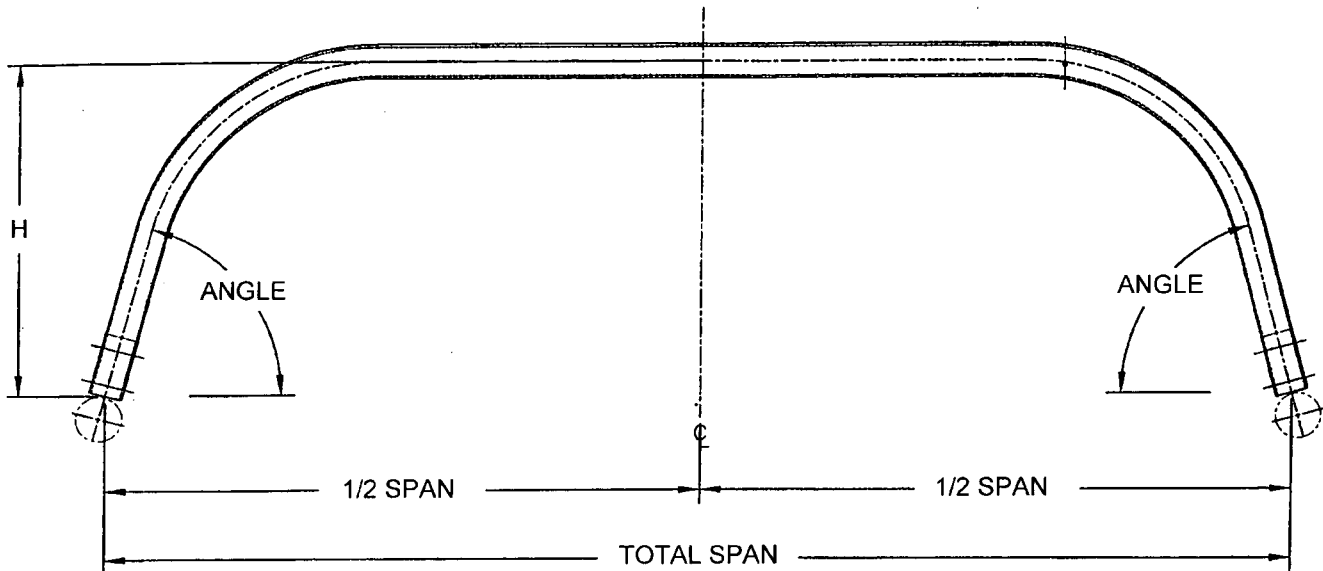
☒ First Article ☐ Prototype

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	0.200				
	R0.063	+/-0.010	0.063				
	2.990	+0.005/-0.000	2.992				
	5.237	+/-0.030	5.237				
	2.600	+0.005/-0.000	2.605				
	2.686	+0.005/-0.000	2.690				
	2.770	+0.005/-0.000	2.773				
	2.854	+0.005/-0.000	2.858				
	2.938	+0.005/-0.000	2.942				
	3.021	+0.005/-0.000	3.026				
	3.133	+0.005/-0.000	3.137				
	3.179	+0.005/-0.000	3.182				
SIDE B	0.200	+/-0.010	0.200				
	R0.063	+/-0.010	0.063				
	2.990	+0.005/-0.000	2.993				
	5.237	+/-0.030	5.237				
	2.600	+0.005/-0.000	2.605				
	2.686	+0.005/-0.000	2.689				
	2.770	+0.005/-0.000	2.773				
	2.854	+0.005/-0.000	2.858				
	2.938	+0.005/-0.000	2.941				
	3.021	+0.005/-0.000	3.026				
	3.133	+0.005/-0.000	3.137				
	3.179	+0.005/-0.000	3.183				
	124.36	+/-0.020	124.36				

<b>Measured by:</b>	BC	<b>Audited by:</b>	SD	<b>Prototype Approval:</b>	N/A
<b>Date:</b>	06.11.19	<b>Date:</b>	06.11.19	<b>Date:</b>	N/A

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-201)	KJ/JLM	
B	06.03.09	Tolerance for 5.237 was +/-0.001	KJ/JLM	

## Crosstube Bend Dimension Sheet



PART NUMBER: \_\_\_\_\_

BATCH NUMBER: 29508

DRAWING: \_\_\_\_\_ REVISION: \_\_\_\_\_

H: \_\_\_\_\_

1/2 SPAN: \_\_\_\_\_

TOTAL SPAN: \_\_\_\_\_

ANGLE: \_\_\_\_\_

QC 15: \_\_\_\_\_

DATE: \_\_\_\_\_

QTY: \_\_\_\_\_



DESIGN PH	DRAWN BY PH	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED [Signature]	APPROVED [Signature]	DRAWING NO. D212-664-241	REV. B SHEET 1 OF 3
DATE 05.02.04		TITLE CROSSTUBE ASS'Y (205/212 HI AFT) NTS	
A	00.12.12	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	

RELEASED  
05-02-09 [Signature]

Qty	Part Number	Description
X	D212-664-241	CROSSTUBE ASSEMBLY (205/212 HIGH AFT)
1	D6006-129	CROSSTUBE
2	D2940-1	SUPPORT
2	D2856-600-1009	ABRASION STRIP
4	MS21920-28	CLAMP

#### GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) MATERIAL: MANUFACTURED FROM D6006-129  
FINISHED LENGTH = 124.36±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 5 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D2940-1 SUPPORT, PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) IT IS OPTIONAL TO SEAL EDGES OF SUPPORTS AND ABRASION STRIP USING SIKAFLEX 241/291 SEALANT.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

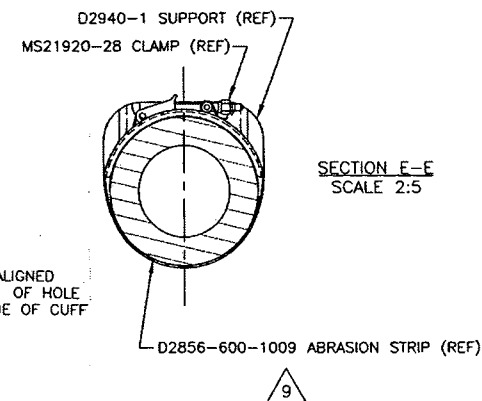
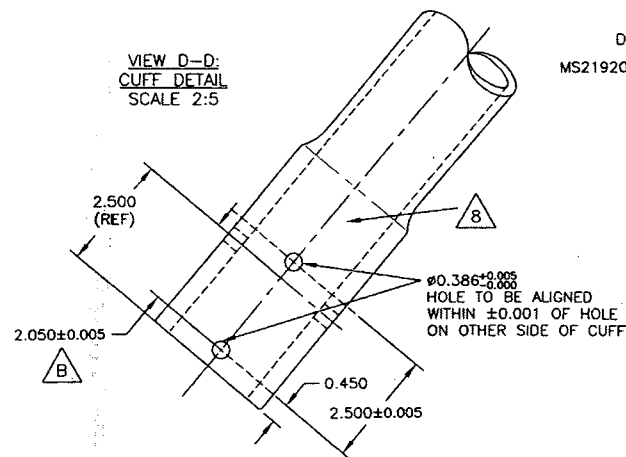
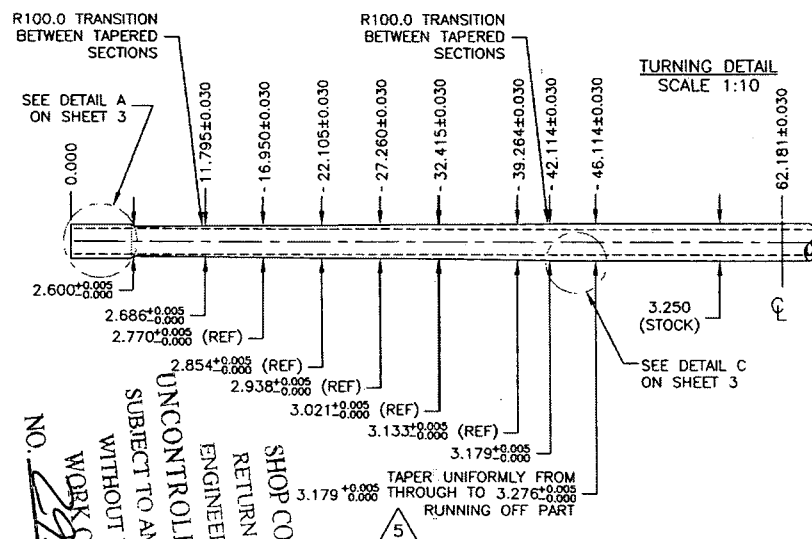
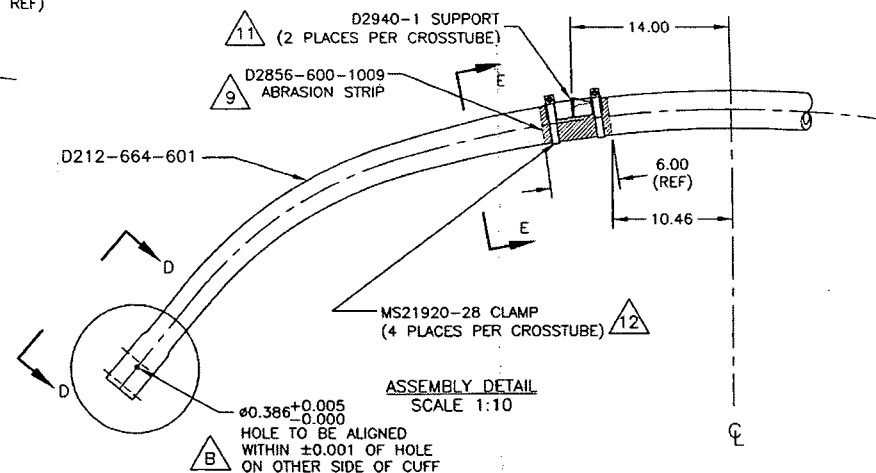
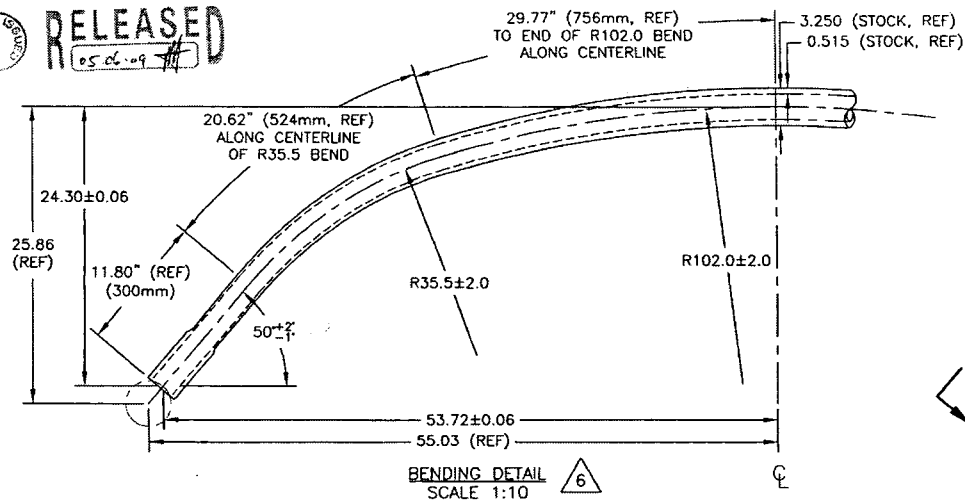
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		DATE	05.02.04			D212-664-241	SHEET 2 OF 3
						TITLE	SCALE
						CROSSTUBE ASS'Y (205/212 HI AFT)	1:10

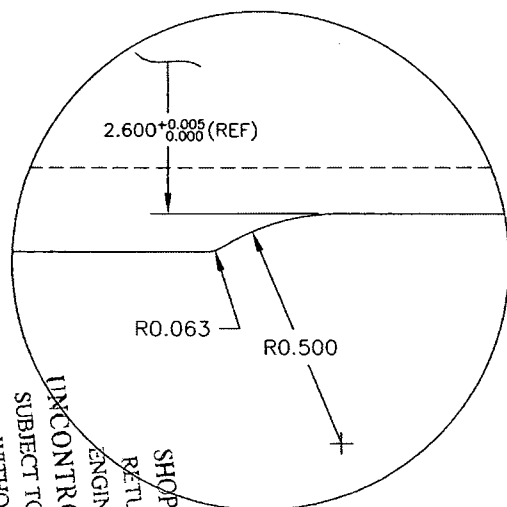
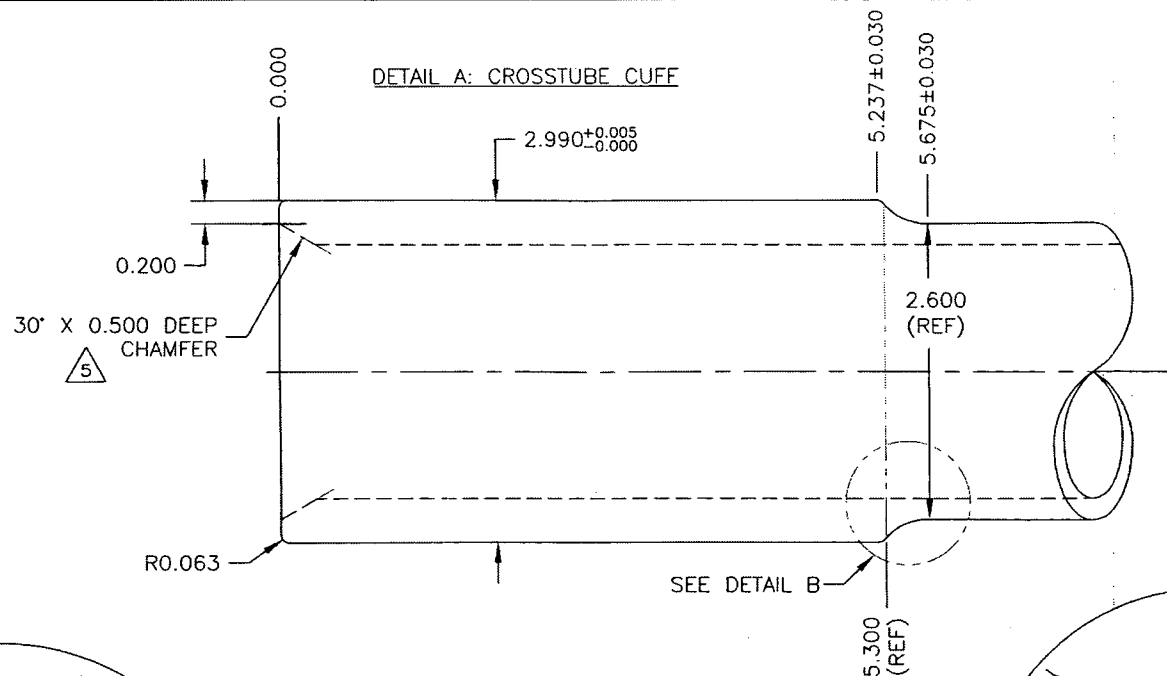
NO. 29508

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WITHOUT NOTICE

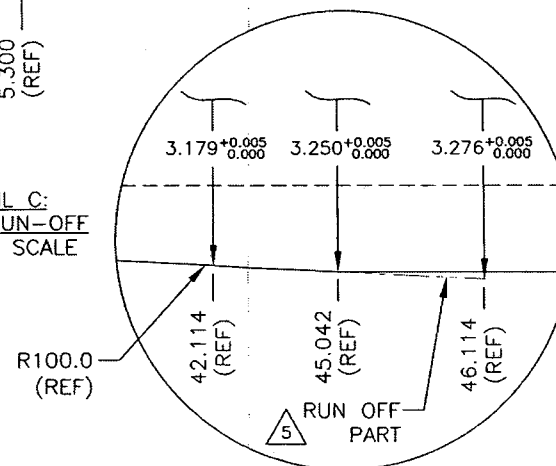
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05-06-09



DETAIL C:  
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DESIGN

FH

DRAWN BY

FH

**DART**

DART AEROSPACE LTD.  
MARKHAM, ONTARIO, CANADA

CHECKED

APPROVED

DRAWING NO.

D212-664-241

REV. B

DATE

05.02.04

TITLE

CROSSTUBE ASS'Y (205/212 HI AFT)

SCALE

1:1

NO. 2508  
WORK ORDER  
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